

THE FORTHCOMING TOTAL SOLAR
ECLIPSE, AUGUST 21.

OWING to the great strides made in the study of the physics of the sun, the importance of the occurrence of a total eclipse of the sun is not so great as it was towards the latter end of last century. Nevertheless, there are still some problems to be solved, the data for which can only be obtained on these occasions, thus necessitating the organisation and dispatching of observers to several stations lying on the path traced out by the cone of the moon's shadow as it sweeps over the earth's surface.

The present year presents us with a total eclipse as near at home as that which occurred in the year 1896; in fact, these eclipses belong to the same family, and it is likely that the event in August next will be as well attended by both amateur and professional astronomers as was its forerunner. It is hoped, however, that weather conditions will be more favourable for successful observation, for it will be remembered that on the last occasion the only party that was fortunate enough to come home with results was that which took up a station in Novaya Zembla.

European observers will be especially favoured by the position of the path of the moon's shadow, because the greater portion of the accessible track cuts Europe diagonally through its central position. Thus, with comparatively little journeying, very favourable stations for observation can be reached.

The accompanying illustration (Fig. 1) shows the general position of the line of central eclipse. It will be seen that the eclipse begins at a point situated in north latitude about $71\frac{1}{2}^{\circ}$ and ends in a latitude a little greater than $23\frac{1}{2}^{\circ}$. The moon's shadow first strikes the earth in far north Canada, passing a little south of the Parry Islands, and pursuing its course just above Baffin's Bay. There it enters Greenland, and sweeps across this sparsely-inhabited region and emerges into the Arctic Ocean. Taking a south-easterly trend, it enters Norway near the island of Vega, and passes out of Sweden near Hernösand, and then crosses the Gulf of Bothnia and the Baltic Sea. The track then enters Russia at Riga, and passes near Minsk, Kiev, and the eastern part of the Crimea, crossing the Black Sea and reaching the opposite coast at Trebizond. It then traverses eastern Turkey and western Persia, and terminates its course on the north-west coast of India.

There is little doubt that the first portion of the eclipse track—that is, the part that crosses the islands north of Canada and Greenland—will not be occupied by special observers. From Norway south-eastwards the case will be different, for there the sun will be at a useful altitude and the eclipse of long duration. On the west coast of Norway the sun will have an altitude of a little over 35° , and the duration about 126 seconds. On the east coast of Sweden the altitude will be more than $36\cdot5^{\circ}$, and the duration 128 seconds. In the region about the Gulf of Riga the sun's altitude will be about $39\cdot5^{\circ}$, and the duration 133

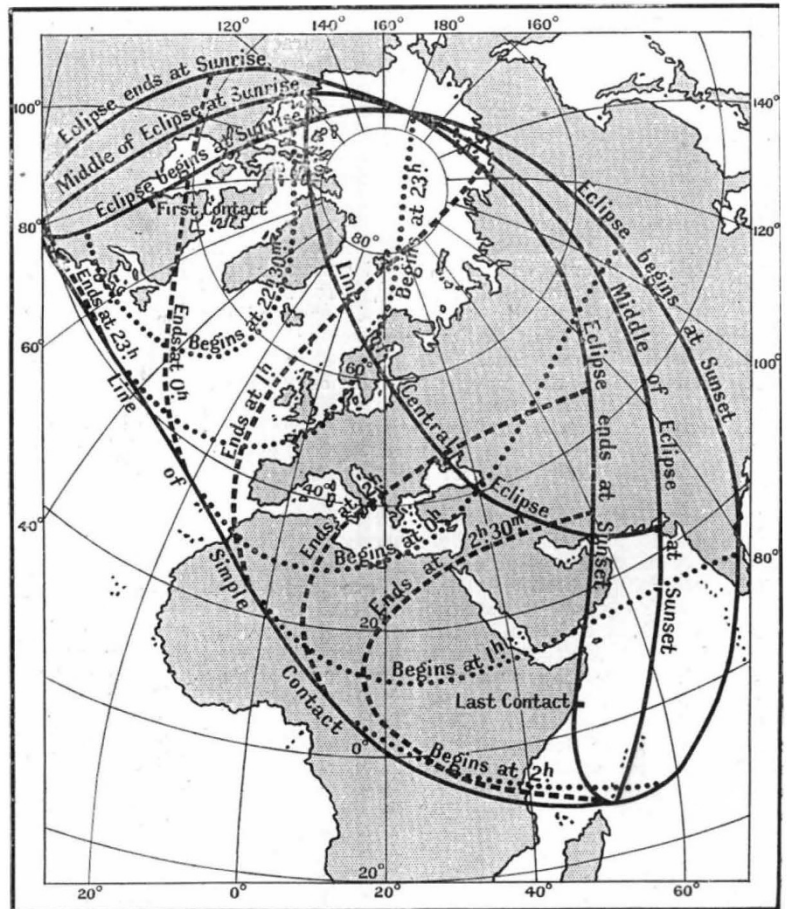


FIG. 1.

seconds. By the time the Crimea is reached the altitude will be somewhat reduced, namely, $36^{\circ} 40'$, and the duration diminished to 129 seconds. An excellent large-scale chart of the whole track of the eclipse across Europe accompanies Count de la Baume Pluvinel's article which appeared in the March number of the *Bulletin de la Société Astronomique de France*, and this should be consulted by all who wish to take up a suitable position on the track. Those who proceed to Norwegian stations will find some useful data published recently in the *Observatory* by Prof. H. Geelmuyden. There it is stated that among

stopping places for the ordinary coast steamers, going out from Bergen or Trondhjem, may be named Sannessjøen, situated on the north end of the Alsten Island, from which stations near the central line will be easily accessible, either on the same island or (by motor boat or local steamers) on some other islands towards the north-west. From Mosjøen, situated at the end of the deep Vessen Fjord, stations near the central line in the Vessen valley may be reached by carriage. Brønnø is a stopping place not far from the southern limit, and Bodø is a little outside the northern limit. Details concerning the path of the shadow track across Turkey and Persia and the

for the more scattered the observers are the more chance there is of some results being secured.

As to the actual expeditions that are in active preparation, the following statements may be made, and the accompanying map (Fig. 2) will help to indicate the positions of the stations which will be utilised. Dealing first with the British parties, the joint permanent eclipse committee of the Royal and Royal Astronomical Societies is sending out five observers. Three of these observers, namely, Prof. Fowler, Mr. W. E. Curtis, and Major Hills, will be stationed near Kief in Russia, and will undertake the photography of the spectrum of the chromosphere during the

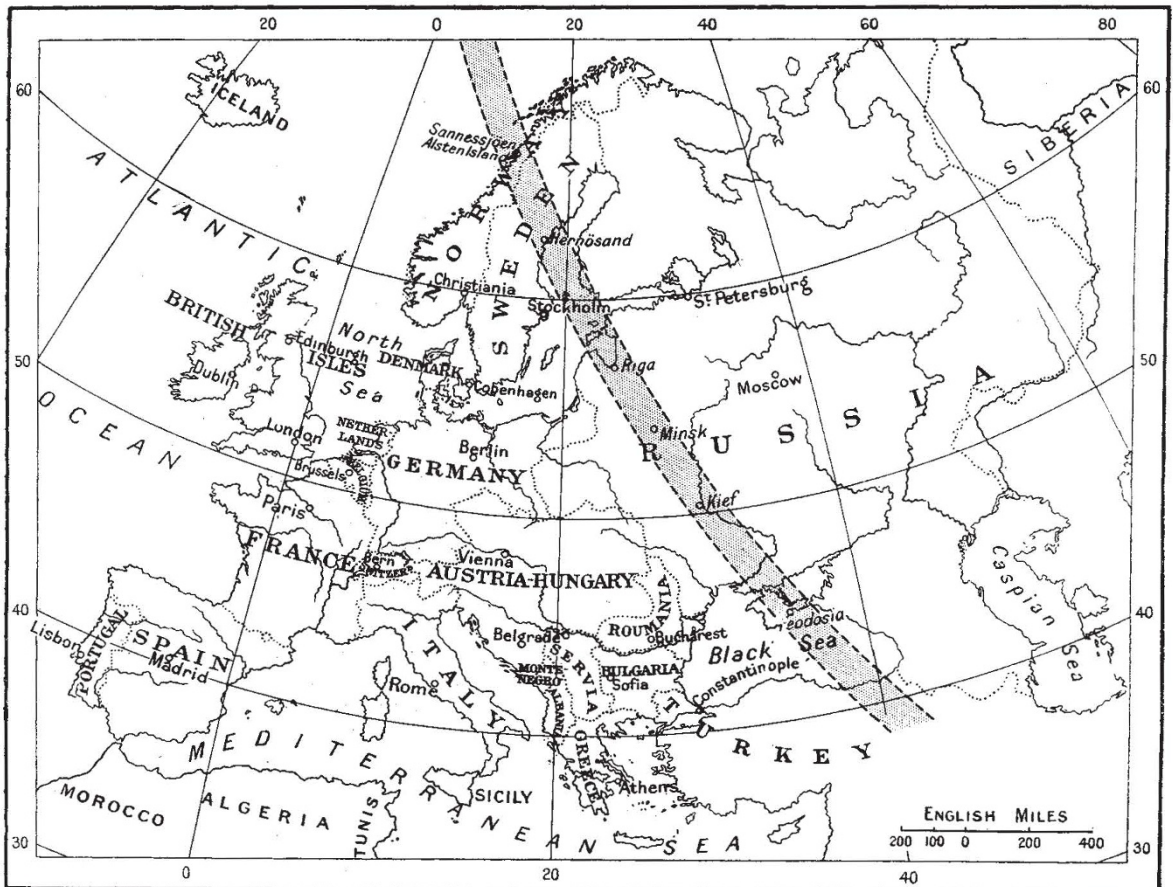


FIG. 2.

Stanford's Geogr. Estab., London.

accessible places for forming camps in these countries have been described by Prof. David Todd in these columns (vol. xciii., p. 311, May 21), so that further reference to these regions becomes unnecessary.

With regard to the weather conditions that will be experienced, the probability of fine weather seems to increase the further east along the track the station is taken up. According to the information that is to hand, most of the main official expeditions will be located along the Russian portion of the line, where the good weather chances are more promising, but this should not deter others from occupying Norwegian or Swedish stations,

partial phases, using the iron arc as a comparison spectrum. For this purpose a grating will be used giving much higher resolving power than any previously employed during an eclipse. Fathers Cortie and O'Connor are being sent to Hernösand in Sweden and will undertake direct photographs of the corona and photographs of the spectrum of the corona with special regard to the yellow and red regions. They will be accompanied by Messrs. J. J. Atkinson and G. J. Gibbs as volunteer helpers.

From the Royal Observatory, Greenwich, two observers, Messrs. Jones and Davidson, will take up their station at Minsk, in Russia. The pro-

gramme of this party will consist in securing large-scale photographs of the corona, the spectrum of the corona and chromosphere, more especially in the ultra-violet region, and photographs of the corona through "mercury-green" glass for investigation of the distribution of "coronium." Near Feodosia, in the Crimea, the party from the Solar Physics Observatory, at Cambridge, namely, Prof. Newall, Mr. Stratton, and Mr. C. P. Butler, will take up their stations. The work that will be undertaken includes small- and large-scale direct photographs of the corona for extensions and details respectively, objective grating photographs of the chromosphere for comparison with the slit spectra taken by Prof. Fowler's party, and lastly, polariscopic observations.

Feodosia will also be the observing station of two German expeditions, namely, one from the Astrophysical Observatory at Potsdam, and a second from the Royal Observatory in Neubabelsberg, near Berlin. Near Feodosia, at Starg Krym, an expedition from the Hamburg Observatory in Bergedorf will take up its position. The programme of the work to be undertaken by this expedition, kindly communicated by the director, Prof. R. Schorr, includes photographs of the corona with telescopes of focal lengths of 4, 10, 20, and 40 metres, with and without screens, a search for intermercurial planets, and photographs of the spectra of the chromosphere and corona.

In addition to the above, Prof. Miethé, of the photochemical laboratory of the Technical High-school in Berlin, is going to Sannessjøen, Alsten Island, in Norway, and it is quite possible that parties from other German observatories may swell the number of expeditions.

Feodosia will also be the selected spot for three French missions, details about which have been kindly communicated by Count de la Baume Pluvinel. Count de la Baume Pluvinel himself leads a private expedition, with Messrs. Senouque and Rougier as his assistants. Their instrumental equipment will consist of a two-mirror coelostat worked in conjunction with objectives of 12 and 3 metres for the photography of the corona. Two slit spectroscopes and two prismatic cameras with flint and quartz prisms will also be used, and measures will be made of the intrinsic brightness of different portions of the corona.

A second expedition is that which will set out from the Nice Observatory under the direction of M. H. Chrétien. M. Chrétien will be accompanied by M. Lagrula, and they will take up a position at Feodosia. Their main instrument will be a coelostat with two mirrors, one of which will feed an objective of 6 metres focal length, for securing photographs of the partial phases and of the corona, the other supplying light to a slit spectroscope for the study of the rotation of the corona. M. Chrétien proposes also to make photometric measures during the partial phases. M. Jekhowsky will also join this party, and will use a concave grating of 6 in. diameter and 7

metres radius of curvature for the study of the spectrum of the chromosphere in the ultra-violet.

M. Salet, of the Paris Observatory, is also going privately to Feodosia. He will use both an equatorial and a coelostat, and his chief endeavour will be the photographic study of the polarisation of the light of the corona.

Feodosia is also the station that Dr. Perrine will observe from, and of the expedition being organised by the Lick Observatory under Prof. W. W. Campbell one section will proceed to Kief while the other will occupy Feodosia. A Russian party under Dr. Donitch will also take up quarters at the latter place.

While most of the expeditions are concentrating at Feodosia, it is hoped that other intending observers will take up positions further north. No doubt several amateurs, both British and foreign, are completing their plans for the event.

The eclipse committee of the British Astronomical Association, of which Mr. G. F. Chambers is chairman, have been endeavouring to organise parties for different stations. From information received, it seems likely that the Royal Mail Company's *Arcadian* will convey numerous members to Norwegian coast stations, while Hernösand, on the coast of Sweden, is likely to claim about a dozen; and Riga, in Russia, perhaps a somewhat larger number. It is probable also that a small number will go to the Crimea, enticed by the more favourable prospects of possibly finer weather conditions. It is interesting to note that while a total solar eclipse does not offer very much scope for the use of colour photography, yet several attempts are going to be made with small instruments. Writing from the Nikolai chief observatory at Pulkovo, Prof. Backlund (*Astr. Nach.*, No. 4740) states that, after a conference with the Minister of Finance, every facility will be offered by the Government to further the interests of the various expeditions proceeding to Russia, and that all instruments will be customs free provided observers return with them.

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INTERNATIONAL FISHERY INVESTIGATIONS.¹

THE official reports on the work of the International Council for the study of the sea contained in the three volumes now under review mark a definite and important stage in the history of that undertaking, since for the first time recommendations on a considerable scale are put forward for international legislation dealing with the fisheries of the North Sea. From the commencement of the international undertaking particular attention has been directed to the plaice fisheries, and it is in connection with these that we now have not only a considerable part of Prof. Heincke's general report, but also a series of resolutions agreed to by the whole Council, which may be supposed to have resulted from

¹ Conseil permanent international pour l'exploration de la mer. Rapport et Procès-Verbaux des Réunions, vols. xvi., xviii., and xix.